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**OPERABLE UNIT (OU 2) TREATABILITY STUDY
WORK PLAN APPROVAL**

12-20-91

**DOE-557-92
DOE-FO/EPA
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LETTER**



Department of Energy
Fernald Environmental Management Project
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DOE-557-92

Mr. James A. Saric, Remedial Project Director
U. S. Environmental Protection Agency
Region V - 5HR-12
230 South Dearborn Street
Chicago, Illinois 60604

Mr. Graham E. Mitchell, DOE Coordinator
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell:

OPERABLE UNIT (OU 2) TREATABILITY STUDY WORK PLAN APPROVAL

Reference: Letter, G. E. Mitchell to J. R. Craig, "Conditional Approval OU 2
Treatability Work Plan," dated November 7, 1991

Letter, J. A. Saric to J. R. Craig, "Approval of Revised
Treatability Study Work Plan for OU 2," dated November 25, 1991

Responses to comments received in the referenced letters are due to U.S. EPA and Ohio EPA on January 2, 1992. The DOE wishes to take this opportunity to address the following specific comment received from the Ohio EPA.

Comment: Durability tests should be run during the advanced phase testing for the stabilization of untreated material. The following is the justification for these tests:

- a. Through failure mechanisms such as: desiccation cracks, slope instability, settlement, piping, penetration, erosion, cold climate, earthquakes and construction error, water can permeate through the facility. Therefore, the waste can become saturated, causing the stabilized waste to erode and possibly contaminate the surrounding area. Therefore, to determine what waste matrix is the most durable (erosion resistant), a wetting and drying test is needed.
- b. This radioactive waste has a life expectancy over 1,000 years. There is no data available on the structural longevity of the low level radioactive waste facility.

Since this remediation is to be a permanent solution, a durability test would provide data to help choose the most durable solidified waste matrix.

- c. From the technical document: Stabilization/solidification of CERCLA and RCRA Wastes; Physical Tests, Chemical Testing Procedures, Technology Screening, and Field Activities (EPA/625/6-89/02). In Section 4, Physical Tests to Characterize Waste Before and After Stabilization/Solidification, recommends the use of five physical tests: index property, density, permeability, strength, and durability tests. Durability tests are the following:

1. Freezing and Thawing Test of Solid Waste (ASTM D4842)
2. Wetting and Drying Tests of Solid Wastes (ASTM) D4843)

Response: DOE agrees that durability testing would yield useful additional information for the detailed design developed during the Remedial Design Phase. If stabilization is selected, it is recommended that these tests be performed during Remedial Design Testing.

The comment concerns durability. The emphasis of the comment appears to address specific physical effects related to durability. Saturation, erosion and subsequent possible contamination of the surrounding area are referenced. The effects of weathering such as freezing and thawing and wetting and drying are listed as potential causes of future contamination. The scenario proffered in the comment represents a physical deterioration of the stabilized waste and subsequent release of the constituents of concern.

In the Advanced Testing Stages of the treatability study, TCLP testing is conducted utilizing the sample specimen (mold) used previously for Preliminary Stage I or II testing. The TCLP sample preparation protocol appears to accurately simulate the physical deterioration and potential release of contaminants as presented in the comment. The analysis of the TCLP extract can be employed as an indicator of the success of the fixation process after both physical and chemical (acid) deterioration.

In the Advanced Testing Stage the cylindrical mold that had previously been subjected to Unconfined Compressive Strength testing is crushed in a press to facilitate particle size reduction so that the material is capable of passing through a 9.5mm standard sieve. Through this process much finer sized particles are also generated. The crushed material that is subsequently subjected to acid digestion ranges in size from "dust" up to 9.5mm. DOE believes this mechanical particle size reduction simulates the physical effects of freezing and thawing and wetting and drying referenced in the comment.

The material that has undergone particle size reduction is subsequently subjected to 18 hours of rotary agitation in an acidic extraction fluid and then filtered to obtain the TCLP extract for

analysis. The combination of the physical and chemical breakdown of the mold to generate the TCLP extract for analysis may represent a worse case scenario in simulating the effects of weathering.

In the Advanced Testing Stage, the TCLP extract is analyzed as a final evaluation as to the success of the treatment. The intent of these treatment mixtures is to chemically fix the contaminants in an altered waste matrix and thereby, reduce their leachability. If the formulation passes the TCLP testing one could assume that the durability of the mixture was adequate.

The treatability study as presently designed will provide critical performance data needed to evaluate the applicable treatment alternative and select an alternative for remedial action based on the nine RI/FS evaluation criteria.

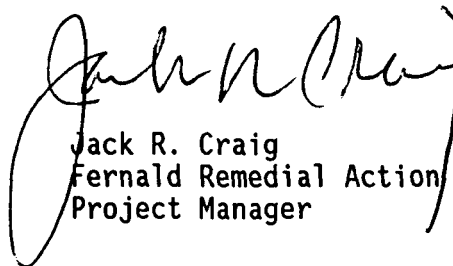
As stated prior, the DOE agrees that durability testing would be beneficial; however, for the aforementioned reasons, it is recommended that for OU 2, these tests be performed during Remedial Design Testing if stabilization is selected as the alternative for remedial action.

The DOE is in the process of developing responses to all the comments received in the referenced letters and intends to include the rational previously outlined to address the concern raised pertaining to durability testing.

I would appreciate an opportunity to discuss this matter with you in the near future.

If you or your staff have any questions, please contact Johnny Reising, of my staff, at FTS 774-9083 or (513) 738-9083.

Sincerely,



Jack R. Craig
Fernald Remedial Action
Project Manager

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cc:

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